Product/Service Description Document
(PDD)

National Digital Forecast Database (NDFD)
Experimental Gridded Data

Approved signed by Glenn Austin for   **Date** 5/22/07

Dennis H. McCarthy
Director, Office of Climate,
Water, and Weather Services

National Digital Forecast Database (NDFD)
Gridded Data
Product Description Document
05/21/07

Part I - Mission Connection

a)   Product/Service Description - Under statute, the National Oceanic and Atmospheric
      Administration (NOAA) National Weather Service (NWS) is charged to collect data on
      climate, water, and weather, provide forecasts and warnings of severe weather in order to
      protect life and property, and create and disseminate forecasts and other weather
      information for the benefit of a wide range of weather sensitive businesses and activities.

      By capitalizing on rapid advances in science and technology and infusing these advances
      into its operations, the NWS has taken steps to proactively respond to ever changing and
      growing demands of its customers and partners. The 2003 Fair Weather report, produced
      by the National Research Council, recommended making NWS data and products available
      in an Internet accessible digital form. The specific recommendation is as follows:
      "*Information held in digital databases should be based on widely recognized standards,
      formats, and metadata descriptions to ensure that data from different observing platforms,
      databases, and models can be integrated and used by all interested parties in the weather
      and climate enterprise*." The Internet is now a principal means of communicating NWS
      forecasts.

      The NWS provides access to operational and experimental gridded forecasts of sensible
      weather elements (e.g., Maximum Temperature, Sky Cover) through the National Digital
      Forecast Database (NDFD). NDFD contains a seamless mosaic of digital forecasts
      originating from NWS field offices, the National Centers for Environmental Prediction
      (NCEP), and the NDFD central server. The NDFD is a high-resolution data set which, in
      its raw form, is non-displayable, but can be processed by computers to meet the varied
      needs of NWS customers and partners.

      This document describes three experimental elements which were included in the NDFD
      when it was first introduced in 2003; see Tables 1 and 2. Additional experimental NDFD
      elements for the CONUS, Puerto Rico, the Virgin Islands, Hawaii, Guam, and Alaska
      added to NDFD since July 2006 are documented in individual PDDs. PDDs for the
      additional experimental elements, including six elements for Alaska, in NDFD can be
      found in the list of NDFD-related PDDs and Service Description Documents (SDDs) at:
               http://www.weather.gov/ndfd/pdd.htm.

      For a list of all the elements in NDFD, see:
               http://www.weather.gov/ndfd/technical.htm#elements

User feedback is important in the evolution of product development. The following tables reflect the periods when comments were solicited for these experimental elements.

Gridded Element	Comment Open Date	Comment Close Date
Quantitative Precipitation Forecast (QPF)	6/13/03	9/15/05
Sky Cover	6/13/03	9/15/05
Snow Amount (not required for Puerto Rico or the Virgin Islands)	6/13/03	9/15/05

Table 1.   Experimental NDFD Gridded Elements for the CONUS, Puerto Rico, and the Virgin Islands.

Gridded Element	Comment Open Date	Comment Close Date
Sky Cover	9/14/04	9/15/05
Snow Amount (not required for Guam)	9/14/04	9/15/05

Table 2. Experimental NDFD Gridded Elements for Hawaii and Guam. Note, QPF for Hawaii is described in a separate PDD; see: http://products.weather.gov/PDD/hi_qpf_pdd_expr_110106.pdf.

Element Characteristics: Depending upon the element, forecast time projections extend out to a maximum of 168 hours; for forecast time projections for individual elements in NDFD, see: http://www.weather.gov/ndfd/technical.htm#elements. Additional data fields having greater temporal and spatial resolution will be added as the NDFD matures.

For more information on the NDFD, please refer to the NDFD home page at: http://www.nws.noaa.gov/ndfd/.

b)   Purpose/Intended Use – NDFD is a central database storing geospatially referenced (GIS compatible) digital forecast information. The NDFD houses both operational and experimental (as defined in NWSI 10-102, *New or Enhanced Products and Services*) gridded elements. The NDFD is the primary means by which gridded forecasts are made available to customers and partners.

c)   Audience – NDFD gridded elements are used by large volume users of forecast information, utilities, emergency managers, businesses/industry, academia, and any others who wish to decode and explore various potential applications of the NWS digital data.

d)   Presentation Format - The data is presented in Gridded Binary, Edition 2 (GRIB2) format and can be readily decoded for those who wish to create derived products from the forecast parameters/values contained within the NDFD. The NDFD elements are available for the CONUS, Hawaii, Guam, Puerto Rico, the Virgin Islands, Alaska, and for 16 pre-defined and slightly overlapping geographic sectors throughout the CONUS, as depicted at: http://www.weather.gov/ndfd/coverage.htm.

A user-defined GRIB2 access is also available. This service allows the user to provide latitude/longitude points for two corners and a weather element. A resulting GRIB2 message is built "on-the-fly" and downloaded by the user. For more information about User-Defined GRIB2 access, please refer to the Products/Service Description Document at:
    http://products.weather.gov/PDD/User_Defined_Grib2.pdf

In addition, NDFD elements are available in Extensible Markup Language (XML). XML is a service that provides the ability to request NDFD data over the internet and receive the information back in an XML format. The request/response process is made possible by the NDFD XML Simple Object Access Protocol (SOAP) server. For additional details regarding XML, please refer to the NDFD XML Service Description Document at:
    http://products.weather.gov/PDD/Extensible_Markup_Language.pdf

Finally, NDFD elements are available via Web Feature Service (WFS). The NDFD WFS server provides standards-based access to the NDFD using Open Geospatial Consortium specifications for sharing data. The WFS allows a specification-compliant client application to request feature data from the NDFD WFS server. Once the data are received, the client can display the NDFD data and merge it with other data sources within a geographic information system. For information on the NDFD WFS, refer to:
    http://www.weather.gov/forecasts/xml/ogc_services/
    http://products.weather.gov/PDD/SDD_NDFD_WFS.pdf

e) Feedback Method - User feedback is extremely important in our effort to improve the quality and usefulness of products and services. Please submit your comments on these experimental grids by completing our brief experimental product survey (http://www.weather.gov/survey/nws-survey.php?code=ndfd-grids). You can submit online feedback even after the comment period has closed.

For general questions regarding the National Digital Forecast Database, please email: nws.ndfd@noaa.gov.

Technical questions regarding the NDFD may be addressed to:
    National Weather Service Headquarters
    ATTN: David Ruth, W/OST21
    1325 E-W Highway, SSMC2
    Silver Spring, MD 20910

Part II - Technical Description

a) Format and Science Basis - The technical information about the NDFD and the forecast elements is available on the web. Descriptions of the temporal and spatial resolutions of the data, geographic coverage, and other details are available at:
    http://www.nws.noaa.gov/ndfd/technical.htm

Definitions of the individual elements are available at:
http://www.nws.noaa.gov/ndfd/definitions.htm

b)   Product Availability – The NDFD GRIB2 data are available via anonymous file transfer protocol (ftp) from an NWS ftp sever; see:
http://www.weather.gov/ndfd/anonymous_ftp.htm.

Alternately, html files are available via http over the internet; see:
http://www.weather.gov/ndfd/access_http.htm.

Forecast grids are generated at the local WFOs and National Centers and revised on an event-driven basis. Revised grids are uploaded to the NDFD server and new mosaics and sectors are generated at the top of each hour. At a minimum, revised mosaics are refreshed daily no later than 2200 Coordinated Universal Time (UTC); forecast grids for the next Day 7 are introduced daily at that same time.

c)   Additional Information -

(1)   National Weather Service Instruction (NWSI) 10-506, *Digital Data Products/Services Specification* provides detailed information on both experimental and operational elements in NDFD. See:
http://www.nws.noaa.gov/directives/sym/pd01005006curr.pdf

(2)   Experimental gridded NDFD elements are differentiated from operational gridded NDFD elements by the subdirectory file structure on the ftp server; see:
http://www.weather.gov/ndfd/anonymous_ftp.htm.

(3)   Experimental gridded elements are evaluated on both objective (e.g., statistical data) and subjective (e.g., internal and external feedback) criteria. If individual elements described in this PDD are declared "operational", they are removed from this PDD describing experimental elements.